DOCUMENT RESUME

ED 232 991 SP 022 850

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TITLE Educational Technology and Teacher Education in Latin America and the Caribbean: A Plan for the Future.
PUB DATE Jul 83
NOTE 20p.; Paper presented at the World Assembly of the International Council on Education for Teaching (30th, Washington, DC, July 11-15, 1983).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Educational Assessment; *Educational Improvement; Educational Objectives; Educational Planning; *Educational Technology; Foreign Countries; Latin Americans; *Needs Assessment; Preservice Teacher Education; Problem Solving; *Systems Approach
IDENTIFIERS Latin America

ABSTRACT

Latin American countries have a long history in the application of educational technology to the improvement of teacher education. Even though past innovations, such as the Multinational Project on Educational Technology have been successful, there are still problems with the quality of teacher education. Apparently, processes have been improved without a careful examination of the link between these processes and achievement of desired results. A six-step model, developed by Roger Kaufman, takes both process and results into account. It is based on the application of the systems approach, a process for identifying, justifying, and resolving problems based upon needs. The process is composed of: (1) identifying the problem from needs; (2) determining solution requirements and alternatives; (3) selecting a solution strategy; (4) implementing that strategy; and (5) determining performance effectiveness. (JMK)

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EDUCATIONAL TECHNOLOGY AND TEACHER EDUCATION IN LATIN AMERICA AND THE CARIBBEAN: A Plan for the Future.

by

ALICIA MABEL ROJAS

The Florida State University

Paper presented
at the XXX WORLD ASSEMBLY OF

INTERNATIONAL COUNCIL FOR EDUCATION ON TEACHING

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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Washington, D.C.
July 11-15, 1983

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EDUCATIONAL TECHNOLOGY AND TEACHER EDUCATION

IN LATIN AMERICA AND THE CARIBBEAN: A Plan for the Future.

Abstract

Most countries in Latin America have a long history in applying educational technology to the improvement of teacher education. Even though these innovations can be considered successful in terms of teachers trained and changes which have occurred in the educational systems, these educational programs are still encountering difficulties in the quality of education. The analysis of this situation indicates that the emphasis has been on the improvement of processes without the careful linkage between the impact of these processes and the useful, desired results. It appears that the results of the educational system (goals and objectives) are considered "valid" without having done any formal analysis of organizational impact, the nature and value of the society for which it is intended, and the current results being obtained. This presentation proposes the application of an holistic approach to the identification and solution of educational problems. This approach focuses on the identification of gaps between desired and actual results to find and select the most appropriate solutions (processes). This application should lead to the achievement of better organizational results and a more appropriate impact on society of the educational systems through the use of educational technology (a process) in the improvement of teacher education (another process).

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EDUCATIONAL TECHNOLOGY AND TEACHER EDUCATION IN LATIN AMERICA AND CARIBBEAN: A PLAN FOR THE FUTURE

by

Alicia Mabel Rojas

Introduction

The history of educational technology applied to Teacher Education in Latin America dates from the late 40's, but of course, the most recent concepts of educational technology are not found in the literature. It was in the late 60's, that the words Educational Technology began to appear in the vocabulary of educators and specialists in media and audiovisual techniques. It is not the purpose of this paper to address the development of the educational technology but it may useful to state that this development has been significantly influenced by the Multinational Educational Technology Project sponsored by the Organization of American States and the Ministries of Education of most of the Latin American and Caribbean countries.

The MPET of the Regional Program of Educational Development of the OAS was the first effort to systematize this field. It started in 1968. In spite of the different accomplishments (trained personnel, new developed instructional materials, periodical research publications, technical assistance) they individually and collectively have not been sufficient to solve the myriad educational problems that still characterize the educational systems of our region.

From an overall appraisal of the actual situation it is possible to state that the educational technology approach as currently defined not using all its potential.

The educational technology approach generally applies the systemic approach which calls for a clear, concise definition of problems in order to select or design the most appropriate strategy or strategies that would allow, when implemented, the solution to the problem(s).

When the present situation is analyzed it is clear that varied strategies have been applied in order to solve educational problems. In almost every country, somewhere...in the nation's capital or other cities or towns, there is an educational radio or television system, some university or college is in charge of an open learning system at distance, or a non-formal educational or vocational system has been implemented. Such examples are almost infinite...If these "solutions" are closely analyzed through a system point of view, all of them can be classified as "processes".

The emphasis has been on process. It seems as if outcomes, the impact on society of the outputs of the educational system, have been largely overlooked or assumed. They seem so obvious! But, if a group of educators are asked to state the outputs and outcomes of the educational system, it can be predicted that there will not a consensus about them, So...how can a solution be selected if there is not a common understanding about the outputs and outcomes that the system is to intended to accomplish?

The processes per-se have been carefully studied when applying the educational technology approach. Improving the processes has become the end rather than the means. For example, better formulation of objectives, adequate application of learning theories, appropriate media selection, varied application and utilization of modern technologies are all intermediate processes of education. Despite all these improvements, there are still complaints about the quality of the educational system and its

outcomes, from administrators, educators, taxpayers, parents, and students.

In the present situation, it seems as if educational technology has to assume a new role and a revised definition of the outputs and outcomes of the educational system in order to assure an adequate selection of methods and means.

This presentation will propose the application of an holistic approach to successfully identify and solve educational problems. The approach focuses on the identification of gaps between desired and actual results as means by finding and selecting the most appropriate solutions. Such application should lead to the achievement of better organizational results and enhanced societal impact of educational systems through the use of educational technology (a process) in the improvement of teacher education (another process).

The impact of the Multinational Project on Educational Technology

Let me expand on what I have said so far.

What kind of actions has the MPET implemented in order to improve Teacher Education?

The main effort of this project was dedicated to developing human resources, institutional resources, improved procedures for information diffusion, and technical capabilities in the member states.

The stated objective was the development of human resources able to identify and solve educational problems as well as to determine, and implement optimal alternative solutions for the identified problems.

I am going to describe some of the strategies followed by the MPET, not only because it has been a valuable experience but it will help you to understand my critique and the approach to be proposed for increasing the impact of the application of educational technology to

Teacher Education.

Till 1979 the MPET had six centers located in Argentina Brazil, Colombia, Chile, Mexico and Venezuela. More than 300 people have been trained in courses in areas like evaluation, instructional design, media selection, educational television production and production of modular materials.

The project has done a follow-up study of its graduates. The main purpose of this follow up was to determine to what degree the training offered has been successfull, what new applications have been made, developments and constraints these ex-trainees have encountered and what services they have been able to provide in their work situation.

A report presented by Turina and Chadwick (1980) indicates that sixty seven per cent of the graduates were able to apply most or all of the new skills and knowledge in their work situation. Fifty two per cent said that they had been promoted because of having taken the course, and sixty per cent had been assigned new tasks and responsibilities.

In relation to the so-called "multiplier" effect, the follow-up questionnaire asked specific questions about the opportunities the ex-trainees have had to disseminate the information they have learned. Ninety per cent reported they have had some form of opportunity to disseminate information through speeches, by teaching courses, through publications or technical assistance. The trainees have given courses about theories of learning, application of system approach, instructional design, media selection, evaluation of instructional materials, television production, educational use of radio. The trainees have taught university students, primary and secondary school teachers, post-graduates courses for principals, supervisors, librarians, directors and producers of television, and teaching personnel of the armed forces. Forty-two per cent of the

course have been in teacher training, 37 per cent in systematic professional training and 21 per cent in pedagogical training to nonpedagogical personnel. The trainees were also asked to give an estimate of the number of students they have taught. They reported a mean of 310 people. These data suggest that there is a very definite multiplier effect from these courses. With over 300 graduates and a mean of 310 students each, the number of people who have been reached through this project is over 100,000.

The new emphasis of the MPET since 1977 was to offer on-site training responding to the requirements of ex-trainees and administrators from different countries. One of the latest and most significant efforts is the training system developed and implemented by the Center in Brazil (Foundation of Educational Television, Rio de Janeiro). It has reached over 300 university teachers of 18 state universities located in priority areas of the country. Most of universities also invited different educational agencies to send two or three participants. In that way the desired multiplier effect took place. The Brazilian center is following up the activities of its ex-trainees as well encouraging the implementation of other activities like research, production of instructional materials and training, to assure the continuation of the multiplier effect.

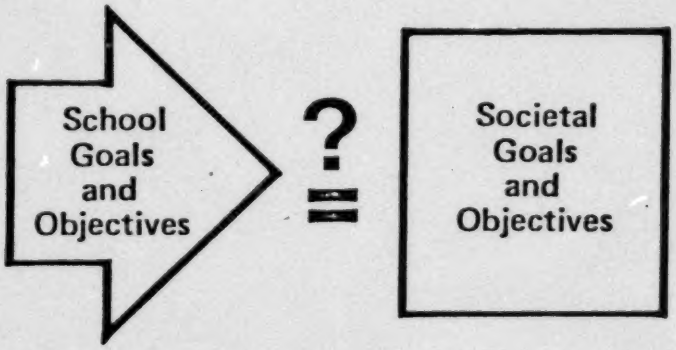
Another relevant action of the MPET is the interchange of information and new ideas. Since 1973 it has used an instructional package called "Educational Technology and Instructional Design", specially produced for a seminar of Latin American specialists in curriculum and educational technology held in Bogota in 1973. This package consists of 1500 slides with six hours of taped material divided into thirteen units. The package also contains a manual with instructions on its use and a programmed instruction section for each unit. It also includes pre- and

post-tests, a large number of supplementary readings and an attitude questionnaire. It has been estimated that this package has been presented more than 300 times to more than 6500 educators through out Latin America and the Caribbean.

An analysis of the data already mentioned, which only refer to some of the actions of the project, indicates that the project has had significant impact on the Latin American and Caribbean educational systems. It can be said, without being exaggeration, that in virtually every federal educational agency there is a graduate the programs in a decision making position. The MPET has trained a large number of people, and has disseminated information, innovations and instructional material. Despite this, the educational systems of the region are still encountering problems. It seems as if we are not able to develop people with the skills and abilities to identify and solve educational problems. We all know about the existence of political, social, cultural and economical factors which impact every educational system. Probably, and this is the point I want to emphasize, we have been, and are, concentrating on improving the means, assuming that every one agrees upon the ends. But...in the process of improving the means (e.g., teacher training, use of modern technologies, open learning classes), it looks as if we are not addressing the real problems: the societal goals and the individual's self-sufficiency and contribution to society. The key question which must be addressed is "do the objectives for learners and schools yield behavior which are important in and for society (Kaufman, 1979)?" (See Figure 1)

If we clearly understand the difference between means and ends we will be able to get to desired and required results. We all know that the design process of education intends to reach societal ends through the achievement of school results using certain school processes and on school

resources. This is a straightforward process upon which everyone agrees. The analysis of the present situation allows us to say that, very often the emphasis of, for example, school boards, multinational projects, parents associations, is on the increase of inputs, and the improvement of processes, without redefining and validating school results in terms of the societal requirements. We frequently hear complaints about low scores in national tests, lack of mathematical and spelling skills, lack of trained teachers. We are focusing in what we can categorize as efforts related to school boundaries. The actions taken upon these complaints are, generally, to increase time for mathematics, retrain teachers, introduce microcomputers, increase salaries. It is a way to improve inputs and processes. What then is the best approach to identify and solve educational problems?



Do the objectives for learners and schools yield behaviors which are important in and for society?

Figure 1: Societal goals and objectives

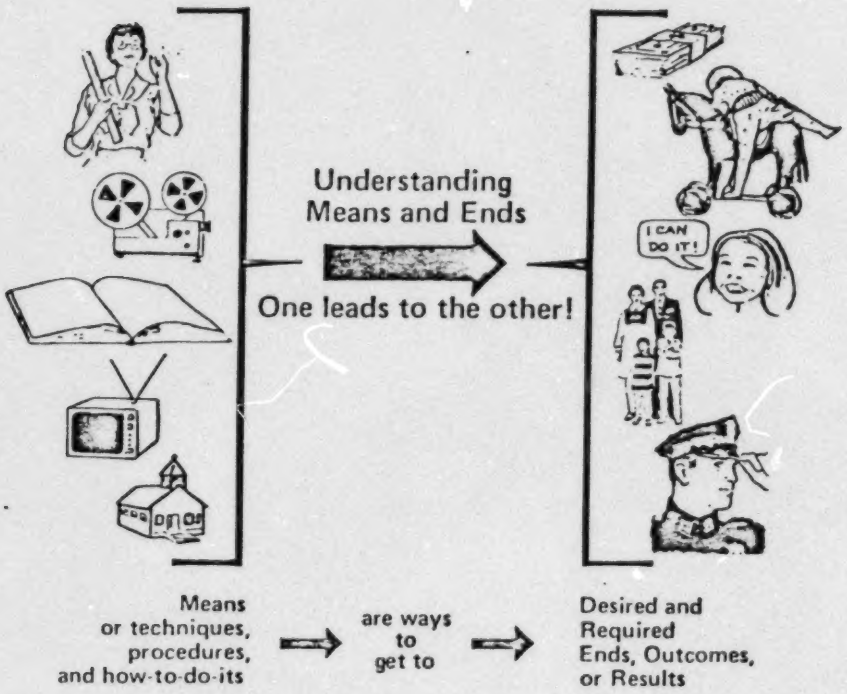


Figure 2: The relationship between means and ends

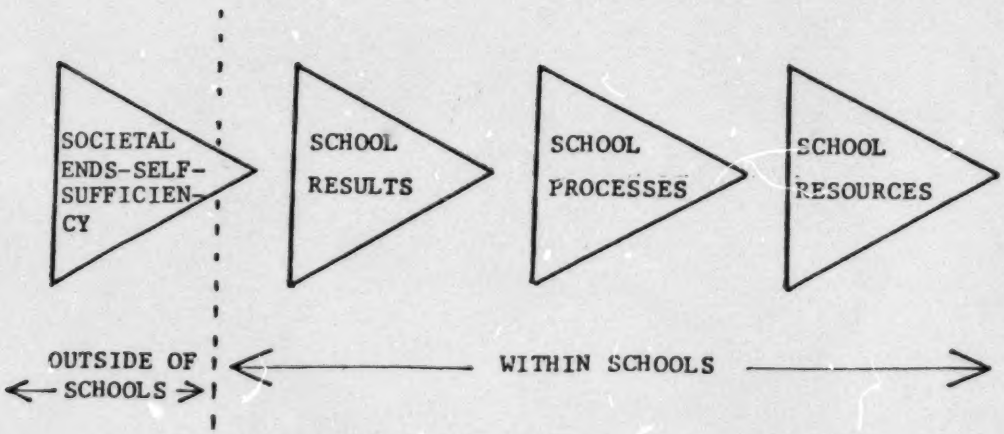


Figure 3: A design process for education

I am going to present an approach that may not be the only answer but experience has shown it to be an effective approach in identifying educational needs and selecting appropriate strategies to satisfy these needs.

The proposed approach

The model has been developed by Roger Kaufman at the Florida State University. It is based on the application of the system approach, which is a logical and rational process for identifying, justifying and resolving problems based upon needs.

When analyzing any given situation, we should look at three types of results: one is for individuals or results which people produce (Products); one is for what the organization can or does deliver (Outputs), and the last is the result result of the impact that an organization's outputs have when delivered outside the organization (Outcomes) (Kaufman, 1979).

Examples of Products, Outputs and Outcomes are as presented in Figure No. 4.

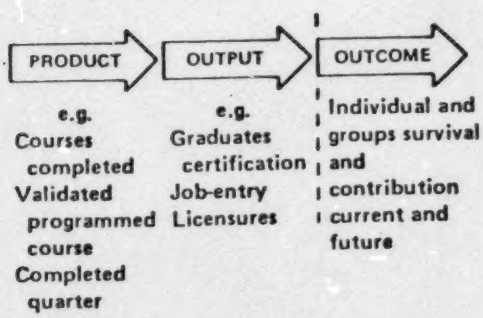


Figure 4: Examples of Products, Outputs and Outcomes

Products are the en-route results, such as course completed, validated programmed courses, a completed term of school work.

Outputs are the total results of an organization or individual efort that is delivered to society, for instance, graduates, certification, job-entry skills, licensures.

Outcomes are the results of the organization's total efforts.They are external to the individual or organization, such as individual and group self-sufficiency and contribution, present and future (Kaufman, 1980).

If we are able to establish the relationship among results (Products, Outputs, and Outcomes), we will able to clearly define the organizational efforts required to achieve these organizational results. The organizational efforts are the Inputs and Processes, means towards defined ends.

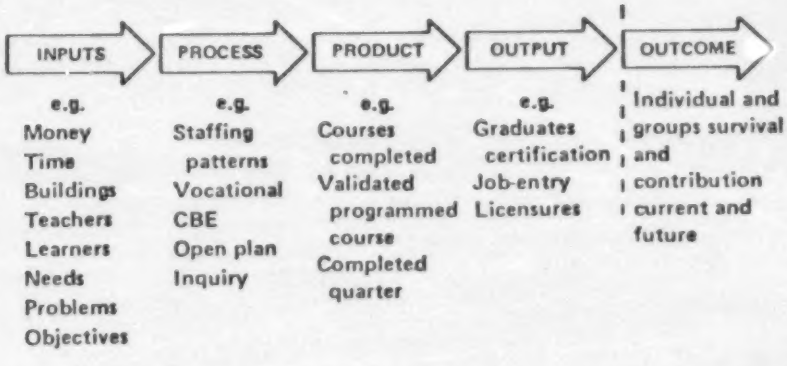


Figure 5: The Organizational Elements

Inputs are the raw materials and ingredients we have to work with, like money, time, buildings, teachers, learners, needs, problem, objectives.

Processes are the how-to-do-its and methods, such as staffing patterns, vocational education, Competency Based Education, open plan and curriculum.

We already know this classification, but very often this distinction between means and ends is not so clear, and we tend to jump into solutions before we are sure what our problem is.

A problem is solved when the gap between current results and desired results are closed. Let me elaborate this definition.

An educational problem can be stated as a problem only if there is a gap that we want to close between the present status and the desired result. For example, if the current drop-out rate is high enough that we want t achieve a total reduction of it, we can say that this is a statement of a problem, the reduction of the drop-out rate. In order to solve it, we have to identify the adequate means, processes, that will assure to close that gap, that need. That is to say, to go from current Outcomes to desired Outcomes.

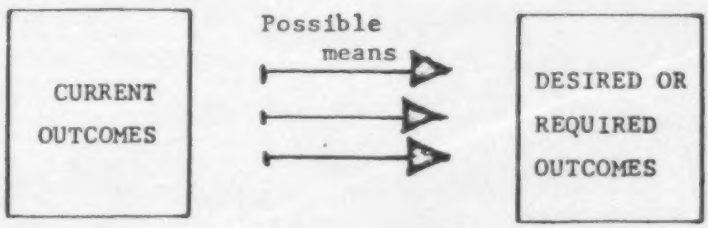


Figure 6: Means and Ends.

Before rushing into any solution, we first should define and justify the ends to be accomplished.

Some results or ends are outside of (external to) the organization or the individual, these results exist in society. Some results are within the organization.

Personal or organizational results, to be most effective, should be directly related to societal results, that is to say, results that are useful in and society. Organizations are means to societal ends (Kaufman, 1980).

Useful and systematic planning relates internal resources, efforts and methods to organizational (in-house) results to external results, and, thus, better assure that individual and organization efforts yield useful Outcomes.

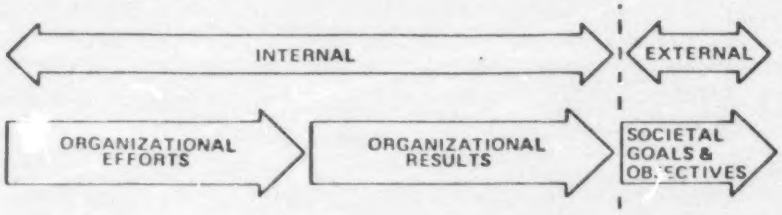


Figure 7: Relating results and organizational efforts

If an organization, through their efforts and results, are not useful to society, they will cease to exist sooner or later. We are witnesses of all the efforts that educational organizations are making, we all know that the results are not useful to society.

Therefore, in problem solving results are important. All the means, the Inputs and the Processes (or organizational efforts), and all the internal results, Products and Outputs (or organizational results), are useful only to the extent that they have utility in the real world - external to the individual and the organization.

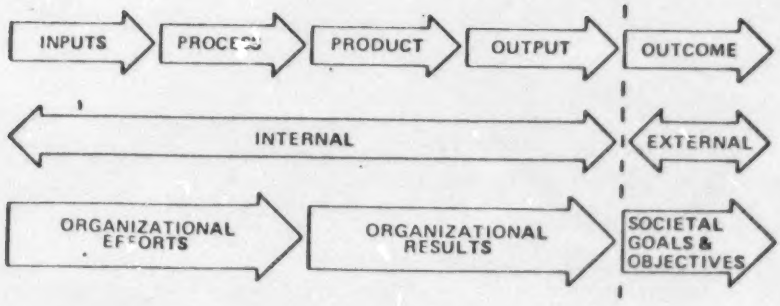


Figure 8: The total relationships

How do we plan and achieve desired results?

If we are getting a certain set of results (products, outputs, outcomes) now, and we want to achieve a different or modified set, we should make two parallel lists, "what is", present results, and "what should be", desired results. In this process of making the lists, we should involve different partners.

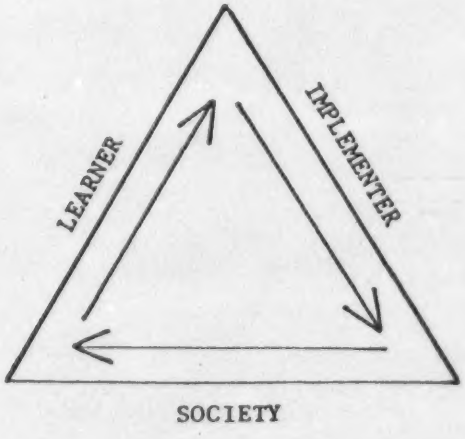


Figure 9: The partners

There are three kind of partners: (1) the learner, (2) the teachers, administrators, and (3) the society, parents, citizens. The importance of the involvement of all the actors is well known but not very often put into practicing.

The purpose of going through with the lists of "what is" and "what should be" is to do a needs assessment. Kaufman (1980) describes a needs assessment as a formal analysis that (a) shows and documents the gaps between current results and desired results), (b) arranges the gaps (needs) in priority order, and, finally (c) selects the need to be satisfy.

Needs assessment is the first step in improving decision making. It is essential to useful planning. It assures us that where we are going is where we should be going.

The needs may be identified by using a Five Organizational Elements model. We should define "what is" and "what should be" for each of the organizational elements. Once we have done that, then we may determine needs.

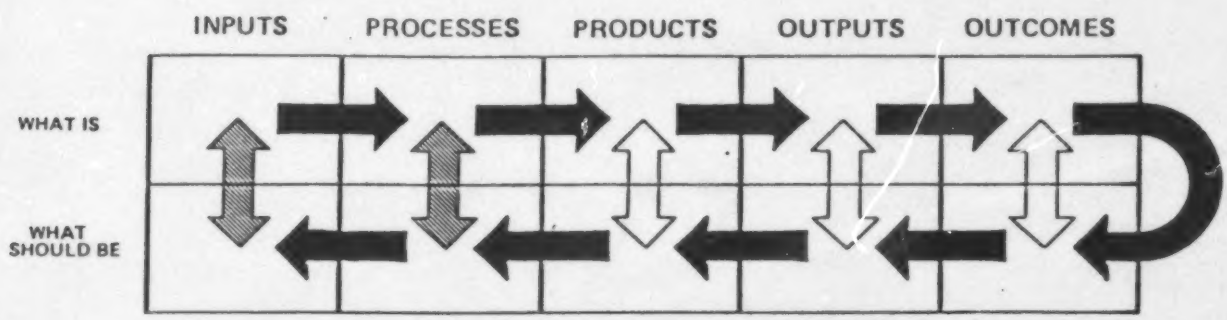


Figure 10: Identification of needs.

In this way, we first identify the need or needs, and select the need to be satisfied what is the gaps in results to be closed that have the highest priority. After that, we identify and select possible methods-means that will make possible to close the gaps.

The approach to use for successfully decision making related to identifying and solving problems is the system approach.

A system approach has two parts, one for identifying "what is" and "what should be"-- determining needs, and one for what must be accomplished in order to get from what is to what should be (Kaufman, 1980).

The six-step problem solving process is used to identify what must be accomplished in order to resolve any problem, and thus, meets the needs (gaps in results) that have been identified, justified and selected for resolution.

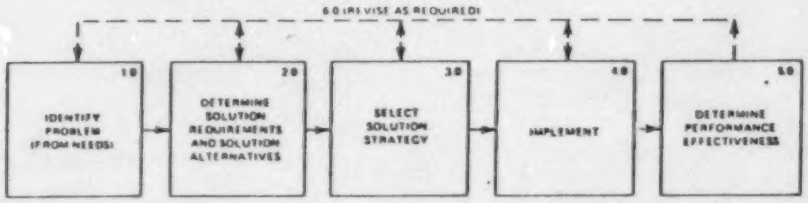


Figure 11: The general problem-solving process

The first product to identify problem based on needs. The second product is to determine solution requirements and identify solution alternatives. The third product is to select the most effective and efficient strategy for achieving the various requirements. The forth step is to implement what has been planned. The fifth step is to determine performance effectiveness. This provides data on what is to be revised, therefore gives diagnostic information that will permit valid system

revision. The sixth step is to revise as required, what implies to make changes at any place in the planning and implementing processes.

The six-step model described here is nothing more than an application of logical problem solving that permit us to plan and achieve relevant and useful educational Outcomes.

Conclusions

Latin American countries have had a long history in the application of educational technology to the improvement of teacher education. Even though past innovations can be considered successful in terms of teachers trained and some changes which have occurred in the educational systems, these educational systems are still encountering difficulties in the quality of education. The analysis of this situation indicates that the emphasis has been on the improvement of processes without the careful linkage between the impact of these processes and the useful, desired results. It appears that the results of the educational system (goals and objectives) are considered "valid" without having done any formal analysis of the organizational impact, the nature and value of the society for which it is intended, and the present results being obtained.

This presentation proposed the application of an holistic approach to the identification and solution of educational problems. This approach focuses on the identification of gaps between desired and actual results to find and select the most appropriate solutions (processes). This application should lead to the achievement of better organizational results and a more appropriate impact on society the educational systems through the use of educational technology (a process) in the improvement of teacher education (another process).

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